

Treatment of Degenerative and Dystrophic Changes of the Lumbar Vertebrae Based on the Diagnose of Magnetic Resonance Tomography

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Abstract As a result of the new developments in the field of medicine in our republic, modern diagnostic equipment with high diagnostic information, such as magnetic resonance imaging (MRT) examination, which has been widely used in patient examination manuals, has become possible to correctly diagnose diseases of the lumbar spine. Osteochondrosis of the lumbar vertebrae is widespread among spinal cord diseases. The MRI examination method has the character of accurate diagnosis and makes it possible to identify the characteristics of the vertebral column and spinal canal in frontal and sagittal sections without injecting a contrast agent. Pathogenetically based treatment methods and surgical methods are considered to permanently eliminate the discopedicular conflict situations caused by the complications of osteochondrosis of the lumbar vertebrae in patients.

Keywords Spine, Spinal disc, Spondylosis, Osteophyte, Fibrosis ring, Rebirth nucleus

1. Introduction

Spondylosis is a chronic disease of the spine, the progression of which leads to thinning of the intervertebral disc, resulting in hernias and osteophytes. If not treated in time, the vertebrae become tangled and lose their mobility [1,2]. Its causes are the natural aging of the spine, overload and injury. Injuries play an important role for these reasons. In case of injury, the surface of the vertebrae is damaged and first defects appear, then a calyx forms in their place and osteophytes grow. Excessive stress on the spine leads to stretching and flattening of the disc. These changes ultimately lead to improper regeneration, often with growth and proliferation of connective tissue, leading to pathological changes in the tissue structures of the disc [3,4]. If an inflammatory process joins the foci, then the disease naturally passes into an inflammatory form and pathological infiltrates appear, combining both exudative and proliferative processes characteristic of inflammation in all tissue structures. Changes of this type are observed in metabolic disorders, i.e. in diseases such as diabetes mellitus, obesity, actomegaly [5,6]. With the development of spondylosis, metabolism is often disturbed and the intervertebral disc causes a lack of substances in the disc tissue. Changes of this type are observed in metabolic disorders, i.e. in diseases such as diabetes mellitus, obesity,

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2. Materials and Methods

The material of the study is surgical interventions performed in the neurosurgical department of the ASMI clinic in 2019-2022, i.e. with discectomy, laminectomy, fibrous membrane of the intervertebral disc, elastic membrane covering the spine, osteophytes on the anterior edge of the common bone, fibrous ring of the disc. All 140 patients in the follow-up underwent MRI to check for osteochondrosis of the lumbar vertebrae. The specific anatomical features of the lumbar vertebrae are best described in the T1-T2 mode. If there are no pathological changes, the lumbar vertebrae have a regular quadrangular shape, and according to the intensity of the received impulses, the cortical and porous parts of the vertebral body are clearly distinguished. The border plates of the vertebral body are clearly separated from the intervertebral disc and the spongy part of the vertebral body in the T1 mode.

3. Results and Discussion

The intervertebral disc is oval in shape and its maximum height is 1/3 of the vertebral body. It does not go beyond the

borders of the vertebral body with its anterior and posterior border. In the T1 mode, the intensity of signals on MRT is not high (120-140m/sec in average intensity). In the T2 mode, two parts of the intervertebral disc are distinguished: the central part is composed of the pulposus nucleus and the peripheral part is composed of the fibrous ring, border plate, orca longitudinal ligament complexes.

In the MRI examination of the lumbar vertebrae of 140 patients under our observation, changes were more clearly identified in the performed sagittal and axial sections in the T2 mode. These changes occurred in accordance with the stages of development of osteochondrosis. A change in the pathological segment is dehydration of the intervertebral disc.

Changes characteristic of degenerative and dystrophic processes were detected in all patients of our observation, in some patients in one disc, in patients who formed the main part, in two or more discs. Degenerative changes are as follows: changes in the shape of the disc, reduction in height, blurring of the boundaries of the nucleus pulposus and attenuation of MRI signals. In the change of the disk due to dehydration, it is possible to distinguish 3 successive stages: a) pathological displacement of the pulposus nucleus in the area of the intervertebral disk; b) bulging of the disc; c) formation of disc herniation (sequestration of the formed disc).

The above degenerative and dystrophic changes cause stenosis in the spinal canal. It indicates the adequate adaptation of the spinal nerve roots located in the area of the stenotic spinal segment to the new conditions.

Thus, surgical treatment of spinal canal stenosis allows to eliminate pain syndromes caused by stenosis.

Some conditions that need to be clarified, namely, lumbar spinal canal stenosis and lumbar osteochondrosis, are present in a small amount in the post-diagnosis period, but new surgical methods aimed at preventing some acceleration of the observed interdisc degeneration process require future application. Determining the type of lumbar spinal canal stenosis and osteochondrosis of the lumbar spine before examination and how many segments disc herniation is observed, and choosing the right examination method increases the efficiency of the examination and the weight of positive results obtained.

Therefore, the correctness of clinically manifested symptoms under the analysis of MRI tomograms of the patients under our observation gives information about the high efficiency of the MRI examination method.

Based on the excellent orthopedic-clinical and diagnostic examinations of 140 patients under our supervision, we performed operations using the following surgical methods:

In 103 (73.6%) patients, since osteochondrosis of the lumbar vertebrae and disc herniation were observed, we used the diagnostic method of arcotomy + discectomy + foraminotomy.

24 (17.1%) patients had osteochondrosis of the lumbar vertebrae, disc herniation, stenosis of the spinal canal, and ossification of the ligamentum flavum.

In 13 (9.3%) patients, osteochondrosis of the lumbar spine, disc herniation, circular stenosis of the spinal canal, hypertrophy of the yellow ligament, osteophytes of the vertebral body, and hypertrophy of the joint surfaces were observed.

Each used surgical method was carried out based on specific instructions, depending on the nature of the disease, its purpose and the condition of degenerative and dystrophic changes in the spinal canal. In the days following the operation, the patient's activation rehabilitation was carried out after the effects of the general anesthetic procedures had completely passed.

We evaluated the effectiveness of procedures in the surgical treatment of osteochondrosis of the lumbar vertebrae using the developed criteria. Of the 140 patients, 95% had good results and 5% had satisfactory results.

4. Conclusions

In short, from the analysis of MRI examinations of 140 patients before the operation, it was found out that it is necessary to accurately diagnose the pathological center of the spine in which segment of the spine, the compression factor, the total volume of the spinal canal, the percentage occupied in the frontal and axial section, and to carry out the necessary small-scale operations, and, creates an opportunity to develop and base instructions on the operation.

Thus, in the surgical treatment of osteochondrosis of the lumbar vertebrae, taking into account its orthopedic features, the performed small-scale surgical methods have the opportunity to eliminate all factors that cause discopedicular conflicts. In these operations, the anatomical structure of the vertebrae is not significantly damaged. Therefore, the operated segment of the spine fully retains its orthopedic properties.

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